Why OFC ?

Manufacturability

FDA class 1 limit

-3 dbm @ 0.2 NA

NA	62.5 um	50 um
0.2	0.9 db	1.9 db
0.3	1.5 db	3 db
0.4	2.3 db	5 db

Gaussian beam

100 um working distance

10 um laser aperture

Assume power is set at safety limit

With 50 um fiber worst case NA gives -8 dbm into fiber.

Other Penalties

Extinction ratio

$$\varepsilon = \frac{P_{lo}}{P_{hi}}$$

$$p_\varepsilon = 10 \log\left[\frac{1-\varepsilon}{1+\varepsilon}\right]$$

$$\varepsilon = \frac{1}{2} \qquad p_\varepsilon = 5\,db$$

With just allowances for NA variation and extinction ratio, 50 um fiber is unlikely.

Further allowances must be made for

- **Laser variations with process, temperature, and lifetime.**
- **IC tolerances across arrays**
- **Packaging tolerances**

OFC Design Issues

Pure ac coupled receiver design with LF cutoff > 1 MHz

When signal drops out, RX will eventually chatter.

All digital OFC solution

More process options for IC's.

Can be executed as a separate IC.

Minimal risk of interoperability problems.

Looking for long term solution for multiple applications

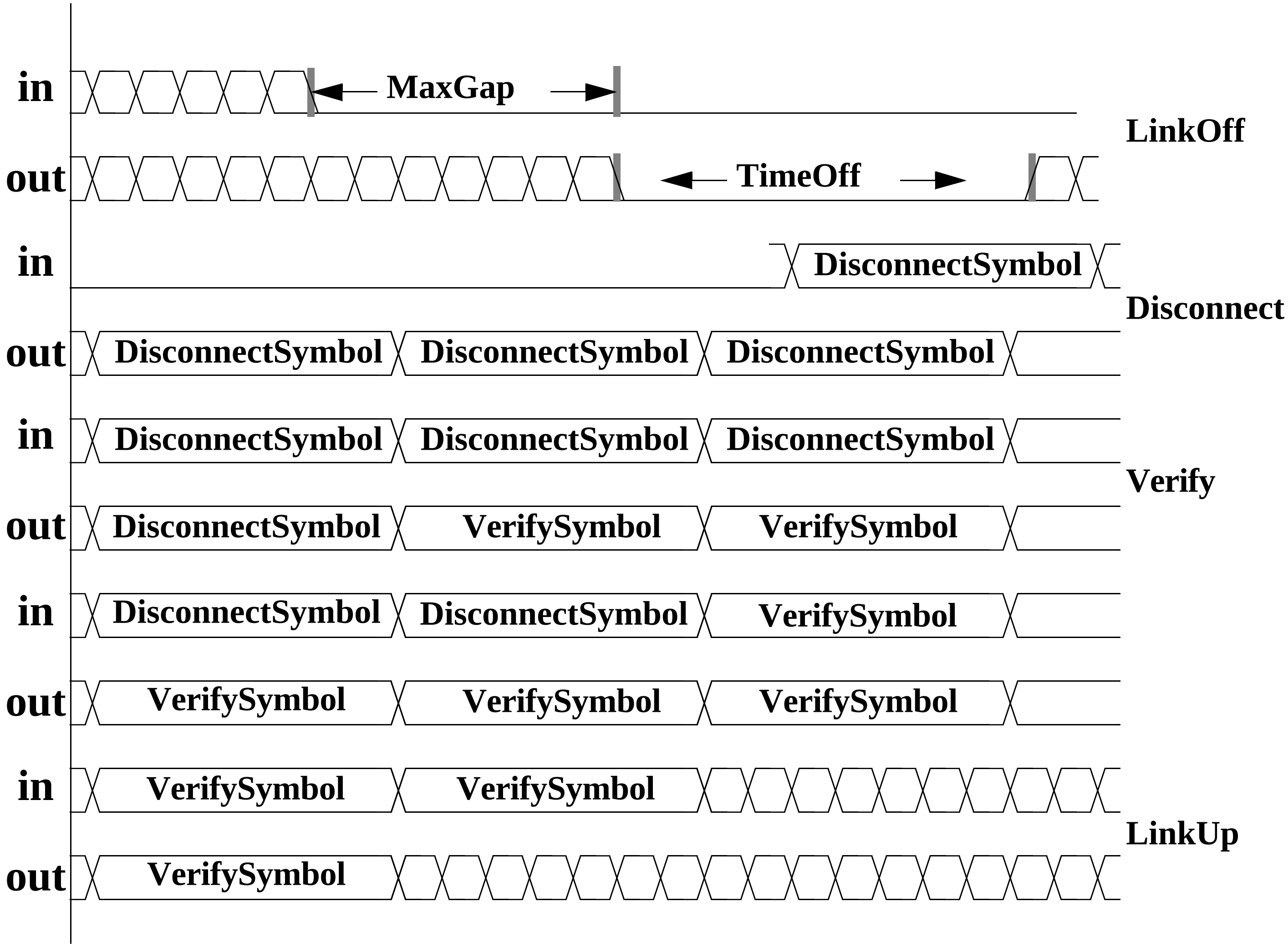
Summary of Palm Springs Proposal

- **Single fiber designated as signaling fiber**
  -- must always be carrying clock or data
  -- transparent once link is up

- **Module must be provided with external clock**
  -- need not be transmitted

- **Manchester coding on signaling channel**
  -- could be at fraction of clock rate

Handshake Sequence



dbs 6/10/97

Status

- c code specification of state machine available by ~ July 1

- Gate count derived from c code
  300 gate equivalents
  In 0.8 um BiCMOS, 60 mA power dissipation when active

- For next meeting
  Error hazard calculated.
  All state machine parameters fixed.
  Power budget with OFC.

- Proceed with specifications for both OFC and non-OFC specifications.